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Claims

1. A device comprising an optical storage medium drive (81) and at least one access unit (83) for reading out data from and writing data to an optical storage medium (82) comprising a plurality of data tracks (70), said device comprising: at least one light source (84) arranged to produce at least one first light beam (21, 31) and at least one second light beam (22, 32); transmitting means (85) arranged to transmit and guide said first light beam and said second light beam towards said data tracks of the optical storage medium; and detecting means (86) arranged to detect light beams that are reflected (33) from the surface of the optical storage medium, **characterised** in that

- said access unit (10, 50, 83) is arranged to pivot on one end in order to move three-dimensionally in relation to the pivot point (101),

- said transmitting means (14, 15, 16, 85) and said detecting means (17, 18, 86) are arranged to move in accordance with the movement of said access unit,

- said transmitting means (14, 15, 16, 85) are arranged to guide said first light beam transversal towards data tracks of the optical storage medium in accordance with the movement of said access unit, and

- said detecting means (17, 18, 86) are arranged to receive the reflected beams of said first light beam or said second light beam from said data tracks of the optical storage medium in order to control the movement of said access unit.

2. A device according to claim 1, **characterised** in that said transmitting means (14, 15, 16, 85) are arranged to guide said first light beam and said second light beam transversal towards data tracks of the optical storage medium in accordance with the movement of said access unit.

3. A device according to claim 1 or 2, **characterised** in that said access unit (10, 50, 83) is arranged to be movable to a position, in which said first light beam (21, 31) and said second light beam (22, 32) transmitted from said transmitting means (14, 15, 16, 85) towards said data tracks of the optical storage medium (11, 82) form a first point (29a) and a second point (29b) on said data tracks of the optical storage medium (11)where the reflected light beams are detected to be in focus and on track by said detecting means (17, 18, 86).

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4. A device according to claim 3, **characterised** in that said first point is arranged to be located in a different location than said second point on said data tracks of the optical storage medium.

5. A device according to claim 3 or 4, **characterised** in that said first point is arranged to be located slightly ahead of said second point on said data tracks of the optical storage medium.

6. A device according to claim 3, **characterised** in that said first point and said second point are arranged to be located in a same intersection point (29) on the track of the optical storage medium.

7. A device according to claim 1, **characterised** in that said transmitting means are arranged to guide said first light beam transversal towards said data tracks of the optical storage medium, and said second light beam perpendicular to said data tracks of the optical storage medium.

8. A device according to claim 7, **characterised** in that said first light beam is arranged to read out data from said data tracks of the optical storage medium and said second light beam is arranged to write data to said data tracks of the optical storage medium.

9. A device according to any of claims 1 to 8, **characterised** in that at least one light source (12) is arranged to be located at or substantial proximity of the pivot point (101) of said access unit (10).

10. A device according to claim 1, **characterised** in that said transmitting means (14, 15, 16) comprise at least one first optical component (15, 15a, 24, 25, 36) for bending said first light beam and said second light beam towards said data tracks of the optical storage medium (11), and at least one second optical component (16, 27, 28, 35) for bending and focussing said first light beam and said second light beam transversal towards said data tracks of the optical storage medium.

11. A device according to claim 10, **characterised** in that said transmitting means (14, 15, 16) further comprise collimating optics (14, 14a) for said light source (12), splitting optics for splitting the emitted light into multiple light beams and focusing optics in connection with said second optical component (16, 27, 28).

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12. A device according to claim 10, **characterised** in that said first optical component and said second optical component are arranged to be a single lens (35) for bending and focussing said first light beam transversal towards said data tracks of the optical storage medium and said second light beam perpendicular to said data tracks of the optical storage medium.

13. A device according to claim 10, **characterised** in that said first light beam and said second light beam are arranged to have opposite polarizations.

14. A device according to claim 10, **characterised** in that said first light beam and said second light beam are arranged to have different wavelengths.

15. A device according to any of claims 1 to 14, **characterised** in that said first light beam is arranged to be produced by a first laser source (51) and be transmitted by first transmitting means (56); said second light beam is arranged to be produced by a second laser source (52) and be transmitted by second transmitting means (58); and said first laser source and said second laser source are arranged to be synchronized by synchronizing means (55).

16. A device according to claim 15, **characterised** in that said first transmitting means (56) and said second transmitting means (58) are arranged to use the same first and second optical components (15, 16).

17. A device according to any of claims 1 to 16, **characterised** in that said detecting means (17, 18) comprise at least one detector element (18) for detecting the reflected light beams of said first light beam or said second light beam, and a third optical component (17) for bending and focussing said reflected light beams of said first or second light beam.

18. A device according to claim 17, **characterised** in that said detecting means (17, 18) further comprise a fourth optical component (15b) for bending the reflected light beams of said first light beam or said second light beam towards said detector element (18), focussing optics (14b) in front of said detector element and splitting optics (17b) for splitting said reflected light beams of said first light beam or said second light beam into multiple light beams.

19. A device according to claim 17 or 18, **characterised** in that said detector element (18) comprises at least two detector surfaces (18a, 18b, 18c, 18d) for detecting the focusing signal and tracking signal of the reflected light beams (1a, 1b, 1c) of said first light beam or said second light beam.

20. A device according to any of claims 17 to 19, **characterised** in that said detector element (18) is arranged to detect by said detector surface (18a, 18b, 18c, 18d) of said detector element at least one focusing signal and at least one tracking signal of the reflected beams (1a, 1b, 1c) of said first light beam or said second light beam received from the surface of the optical storage medium (11), and said detector element is arranged to control the movement of said access unit (10) according to said focusing signal and said tracking signal detected by said detector surface to keep said first light beam and said second light beam in focus and on track.

21. A device according to any of claims 17 to 20, **characterised** in that said detector element (18) is arranged to detect by said detector surface (18a, 18b, 18c, 18d) of said detector element identifying a change in the intensity distribution of at least one focusing signal and at least one tracking signal of the reflected beams of said first light beam or said second light beam received from the surface of the optical storage medium, and said detector element is arranged to control the movement of said access unit by following said change in the intensity distribution to keep said first light beam and said second light beam in focus and on track.

22. A device according to any claims 18 to 21, **characterised** in that said focussing optics (17, 28) in front of said detector element (18, 26) comprises diffractive optical elements (27).

23. A device according to any of claims 1 to 22, **characterised** in that said transmitting means (14, 15, 16) and said detecting means (17, 18) further comprise a waveguide or lightguide (13) arranged to transmit said first and second light beam and/or said reflected light beams of said first light beam or said second light beam along said access unit.

24. A device according to any of claims 1 to 23, **characterised** in that said access unit (10, 50, 83) is an arm unit (41).

25. A device according to any of claims 1 to 23, **characterised** in that the device comprises a first access unit for reading out data from the optical storage medium, and a second access unit for writing data to the optical storage medium, wherein said first access unit and said second access unit is one of the following: an arm unit (41), a sledge unit (45) or any combination of an arm and sledge unit (41, 42, 45).

26. A device according to any of claims 1 to 25, **characterised** in that said device (80) is a communication device.

27. A method for reading out data from and writing data to an optical storage medium in a device comprising at least one access unit, the method comprising steps, in which: at least one optical storage medium comprising a plurality of data tracks, stores data; an optical storage medium driver controls operation of the device; at least one light source produces at least one first light beam and at least one second light beam (901); said first light beam and said second light beam are transmitted and guided towards said data tracks of the optical storage medium (907); and the light beams that are reflected from the surface of the optical storage medium are detected, **characterised** in that it further comprises steps, in which:

- said first light beam and said second light beam are guided transversal towards said data data tracks of the optical storage medium (909) three-dimensionally;
- the reflected beams of said first light beam or said second light beam from said data tracks of the optical storage medium are received (911, 913) three-dimensionally; and
- said access unit is moved three-dimensionally in relation to a pivot point on one end to focus and track said first and second light beams (915, 916, 917, 919, 920).

28. A method according to claim 27, **characterised** in that it comprises step, in which said access unit is controllable to a position, in which said first light beam and said second light beam transmitted and the reflected light beams of said first light beam or said second light beam detected (913), to form at least one first focussed beam and at least one second focussed beam on said data tracks of the optical storage medium on the basis of said first light beam (915), said second light beam and said reflected light beam of said first light beam or said second light beam.

29. A method according to claim 28, **characterised** in that it comprises steps, in which said first focussed beam forms at least one first point (29a) and said second focussed beam at least one second point (29b) on said data tracks of the optical storage medium (915).

30. A method according to claim 29, **characterised** in that it comprises a step, in which said first point is located in a different location than said second point on said tracks of the optical storage medium.

31. A method according to claim 29 or 30, **characterised** in that it comprises a step, in which said first point is located slightly ahead of said second point on said tracks of the optical storage medium.

32. A method according to claim 29, **characterised** in that it comprises a step, in which said first point and said second point are located in a same intersection point (29) on the track of the optical storage medium.

33. A method according to any of claims 27 to 32, **characterised** in that it comprises steps (909), in which said first light beam is transmitted and guided transversal towards said data tracks of the optical storage medium, and said second light beam perpendicular to said data tracks of the optical storage medium.

34. A method according to claim 33, **characterised** in that it comprises steps, in which said first light beam reads out data from and said second light beam writes data to said data tracks of the optical storage medium.

35. A method according to any of claims 27 to 34, **characterised** in that it comprises steps (909), in which at least one first optical component bends said first light beam and said second light beam towards said data tracks of the optical storage medium, and at least one second optical component bends and focuses said first light beam and second light beam transversal towards said data tracks of the optical storage medium.

36. A method according to claim 35, **characterised** in that it further comprises steps, in which collimating optics collimates said light source, splitting optics splits the emitted light into multiple light beams (905) and focusing optics in connection with said second component focuses light beams (915).

37. A method according to claim 35, **characterised** in that it comprises steps (909), in which said first optical component and second optical component is a single lens that bends and focuses said first light beam transversal towards said data tracks of the optical storage medium and said second light beam perpendicular to said data tracks of the optical storage medium.

38. A method according to claim 35, **characterised** in that said first light beam and said second light beam have opposite polarizations.

39. A method according to claim 35, **characterised** in that said first light beam and said second light beam have different wavelengths.

40. A method according to claim 27, wherein the method comprises steps, in which a first laser source produces said first light beam and a second laser source produces said second light beam (901); and said first laser source and said second laser source are synchronized (903), **characterised** in that a synchronization (903) comprises steps, in which

- a first laser source and a second laser source are initialised separately,
- said first laser source turns on (111),
- said first laser source emits said first light beam and a first point is located for read/write operation (113),
- a location of said first point is analysed (115, 117),
- a focusing and tracking of said first point is analysed (116, 118);
- said second laser source turns on (119),
- said second laser source emits said second light beam and a second point is located for read/write operation (120, 121), and
- said second laser source turns off after said read/write operation (123).

41. A method according to claim 40, **characterised** in that a synchronization comprises steps, in which said second laser source turns on resulting said first laser source to go in an interrupt mode for a predetermined time period to said first point (139), and said first laser source continues read/write operation from said first point after the predetermined time period and said second laser source goes in an interrupt mode (141, 143).

42. A method according to any of claims 27 to 41, **characterised** in that it comprises steps (915, 917), in which at least one detector element detects the reflected light beams of said first light beam or said second light beam and a third optical component bends and focuses said reflected light beams of said first light beam or said second light beam.

43. A method according to claim 42, **characterised** in that it further comprises steps (915, 917), in which a fourth optical component bends said reflected light beams of said first light beam or said second light beam towards said detector element, focussing optics in front of said detector element focuses and splitting optics

splits said reflected light beams of said first light beam or said second light beam into multiple light beams.

44. A method according to claim 42 or 43, **characterised** in that said detector element comprises at least two detector surfaces for detecting the focusing signal and tracking signal of the reflected light beams of said first light beam or said second light beam.

45. A method according to any of claims 42 to 44, **characterised** in that said detector element detects by said detector surface of said detector element at least one focusing signal and at least one tracking signal of the reflected beams of said first light beam or said second light beam received from the surface of the optical storage medium, and said detector element controls the movement of said access unit according to said focusing signal and said tracking signal detected by said detector surface to keep said first light beam and said second light beam in focus and on track.

46. A method according to any of claims 42 or 45, **characterised** in that said detector element detects by said detector surface of said detector element identifying a change in the intensity distribution of at least one focusing signal and at least one tracking signal of the reflected beams of said first light beam or said second light beam received from the surface of the optical storage medium, and said detector element controls the movement of said access unit by following said change in the intensity distribution to keep said first light beam and said second light beam in focus and on track.

47. A method according to any of claims 27 to 46, **characterised** in that it said access unit is an arm unit.

48. A method according to any of claims 27 to 46, **characterised** in that it comprises steps, in which a first access unit reads out data from the optical storage medium, and a second access unit writes data to the optical storage medium, wherein said first and said second access unit is one of the following: an arm unit, a sledge unit or any combination of an arm and sledge unit.

49. A method according to any of claims 27 to 48, **characterised** in that it said device is a communication device.